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ABSTRACT

This paper describes an enrollment forecasting model that was developed in 1988 by the Office of Institutional Research for a small, private, liberal arts college (Wesley College, Delaware). The college, shifting in demographics from its historical junior college mission to that of a comprehensive baccalaureate institution, required a forecasting model that took into account this transition of student enrollment from a college providing largely associate and transfer degree programs to one that provides baccalaureate degree programs. An explanation is provided of the model's development and use and includes the assumptions that were required for projecting the composition of the 1988-89 and 1989-90 academic year enrollment. In addition, statistics are provided showing the forecast's enrollment projection error rates and the retention percentages per term and by degree program at admittance. The paper concludes with a discussion of how the forecasting model benefitted the college in its budgeting and strategic planning processes. Contains 17 references. (GLR)

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Forecasting Enrollment in a Period of Institutional Transition

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Institutions of higher education, like organizations of other industries, are faced with a continually changing environment that requires adaptation to ensure survival. Over the last decade, colleges and universities have faced declining traditional-aged student populations as well as other demographic shifts within the external environment. Such shifts have led to warnings of a fundamental transformation which threatens to have a profound impact on higher education (Cameron & Ulrich, 1986). This paper describes an enrollment forecasting model developed in 1988 by the Office of Institutional Research for a small, private, liberal arts college that is undergoing an institutional transition from its historical junior college mission to a comprehensive baccalaureate institution to adapt to changing demographics. The model takes into account the transition of student enrollment from largely associate and transfer degree programs in the past to the new baccalaureate degree programs of the present. The model is aiding the college in various aspects of decision making, including budgeting as well as strategic planning.

The concept of organizational adaptation, especially as it relates to strategic choice and strategic planning, has recently been introduced to the higher education community (Nordvall, 1982; Cameron, 1984; Chaffee, 1985; Cope, 1987). Organizational adaptation refers "to modifications and alterations in the organization or its components in order to adjust to changes in the external environment." (Cameron, 1984, p. 123) Views of organizational adaptation vary in the literature. With "natural selection", the external environment, not management, controls adaptation. With "strategic choice", the actions of managers, not the environment, are seen as the important causes of organizational adaptation (Hall, 1972). The interactions and interdependence between strategic choice and the environment have also been used to define organizational adaptation (Hrebiniak & Joyce, 1985).

Events and methods of organizational adaptation tend to be organization specific; that is, what works for one organization may not work for others (Chaffee, 1984). One method of adaptive response to the environment in higher education involves the broadening of institutional mission or program offerings. Over the period from 1948 to 1968, eighty-nine two-year colleges transitioned to four-year institutions, a process which has been seen with increasing frequency (Hodgkinson, 1971). In a study of the adaptation responses of two sets of colleges, Chaffee (1984) noted that "the frequent assumption is that changing academic programs and attending to recruitment are the primary levers for improving the condition of the college. The fact that nearly all of the colleges in this study increased the number of academic programs they offered and made structural changes in order to attract students suggests that colleges often use those levers." (p. 232)

Lewin's model of change describes the process of organizational change in three phases: (1) unfreezing the existing structure, or creating a disruption of equilibrium, (2) moving the institution to its new state, and (3) refreezing the organization, or establishing a new equilibrium (Hanson, 1985; Jackson, Morgan, & Paolillo, 1986). The institution in the current study exemplifies the change processes involved in the organizational adaptation to shifts in the external environment.

Historically a junior college offering associate and transfer-degree programs, the institution faced the environmental impact of declining student enrollment and impending financial difficulty. In 1983, a new president responded to these problems by aggressively initiating a transformation of the institution from its junior college roots to a comprehensive, baccalaureate institution. Commitment to the new institutional classification can be seen around the campus. Over the past seven years, the number of baccalaureate-degree programs increased from six to twenty-two while the number of associate-degree programs steadily declined. Faculty hiring standards have been raised to emphasize the requirement of a doctoral degree, typically required for comprehensive institutions. The institution's fundamental change in structure is reflected in the composition of the student body as well. The percentage of students admitted in the Fall, 1986, class who declared a baccalaureate-degree major was slightly less than 30 percent. This percentage increased annually to over 65 percent for the Fall, 1989, entering class. Full-time student enrollment increased each year from the onset of the transition, achieving its highest level in the over 100-year history of the college in the Fall, 1989, semester.

Allocation of institutional resources is problematic

during the transitional phase of the change process. Resources must be allocated in part to maintaining the status quo while, at the same time, a level of resource allocation is required to "fuel" organizational change, thereby altering the allocation of resources within the institution (Kaufman, 1971). Budgeting for this college is based largely on the projected size of the full-time student body, since tuition and fees represent the vast majority of institutional revenues. Forecasting enrollment, while never an exact science, is especially difficult during this period of transition as admission and retention rates are also adjusting. Because of the small size of the college and the sensitivity to enrollment shortfalls, budgeting had been based on unrealistically low enrollment estimates, which limited the administration's ability to develop a comprehensive budget or adequately plan for the future.

FORECASTING ENROLLMENT

A review of literature yielded several enrollment forecasting models which focus on compositional factors of the student body (Weiler, 1980; Chatman, 1986; Yost and Chino, 1986; McFaul, Wilders, Loscheider, & Luze, 1988; Dickey, Asher, & Tweddale, 1989). None of the models, however, were applicable to the shifting demographics of the institution in transition. In 1988, an enrollment forecasting model was developed by the Office of Institutional Research and Planning which is sensitive to the college transition.

The projected enrollments are based in part on the current retention of students in baccalaureate (BACC) and non-baccalaureate (NBACC) programs. The NBACC programs include the remaining associate and transfer degree programs as well as those students admitted who are undecided. Inasmuch as the institution has only recently created several BACC programs, the retention data was collected for each semester beginning with the Fall, 1984, entering class.

The students who enter the institution as full-time are longitudinally tracked with their entering class over the successive semesters. All students entering in the Fall, 1984, semester, for example, have been combined and tracked from the Spring, 1985, semester to the present. For each of the semesters from Fall, 1984, to the present, the full-time enrollment from each class has been separated into BACC and NBACC majors, thereby producing retention statistics for each class by semester.

In the initial model, actual enrollment numbers were used for the Fall, 1984, to the Spring, 1988, semesters, which pro-

vided the initial data for the projection of returning students. The average retention (geometric mean) for each semester for BACC and NBACC students is used in projecting the contribution each class will make to the full-time student enrollment over the projected period. In February of each year, the model is updated to include the retention data for the latest Fall and Spring semesters.

Table 1 shows the average retention of full-time students by term (Fall or Spring) and degree type (BACC versus NBACC) of admittance. Retention into the second semester of the students entering in a BACC program is 91 percent, which is over 10 percent higher than their NBACC counterparts. By the sophomore year (third semester), of those students entering in a Fall semester, almost 7 of every 10 students seeking a baccalaureate degree are retained, as compared to approximately 5 of every 10 students seeking an associate degree.

Table 1
Retention Percentages by Term and Degree Program of Admittance

	FALL Admittance		SPRING Admittance	
Semester	BACC	NBACC	BACC	NBACC
Second	91.1%	80.8%	54.2%	40.0%
Third	68.9	51.5	41.7	34.3
Fourth	64.7	44.1	29.5	16.3
Fifth	49.8	15.6	31.2	12.4
Sixth	46.6	12.1	0.0	0.0
Seventh	44.8	6.8		
Eighth	44.9	6.3		
Ninth	32.1	2.5		
Tenth	12.5	2.5		

BACC: Students enrolled in a baccalaureate degree program.
NBACC: Students enrolled in a non-baccalaureate degree program.

In projecting the composition of the incoming classes for the years forecasted, two assumptions are required. The first assumption is the number of students for each future entering class who will select a BACC program versus a NBACC program. The percentage of students entering in a BACC program has

increased from 22 percent of the Fall, 1984, entering class to 65 percent of the students entering in the Fall, 1989, class. This percentage, for projection purposes, is modestly increased by 2 percent for each Fall term over the previous Fall term for the years forecasted. The Spring semester entering classes, which are quite small, are held constant based on past entering classes at 60 percent.

The second assumption is the size of each freshman class for the Fall and Spring semesters for the forecasted period. Because new student admission has fluctuated widely over the past five years (a range of 100 students), three scenarios are projected and labelled best case (400), average case (350), and worst case (300). The size of the entering Spring classes is held constant at 20 students, based on the stable student yield for the past Spring terms.

Table 2
Enrollment Projection Error
1988-89 and 1989-90 Academic Years

Semester	Projection	Actual	Error
Fall, 1988	804	825	-2.5%
Spring, 1989	743	719	+3.4%
Fall, 1989	867	875	-0.9%
Spring, 1990	779	775	+0.5%

The model was used to project the 1988-89 and 1989-90 academic year enrollment. The projections, actual enrollment, and percentage of error are shown in Table 2. The model experienced a +0.3 percent error in the 1988-89 year, and a -0.4 percent error in the 1989-90 academic year. The margin of error per semester was less than 4 percent in the first year and less than 1 percent in the second year of usage.

USING THE MODEL

The forecasting model is aiding the college in a variety of ways, but mostly in budgeting and strategic planning. For purposes of budgeting, the model provides the budget with a forecasted enrollment as well as enrollment by entering year.

In 1985, the college adopted a tuition freeze program which guaranteed students a fixed cost of tuition for eight consecutive semesters. The tuition freeze policy was eliminated in 1989, but the effects of the policy continue until all entering classes admitted through 1989 experience eight consecutive semesters. The enrollment forecasting model provides the budget committee with estimates of how many students enrolled in the projected period will be eligible for the tuition freeze.

In strategic planning, the model has been extremely helpful. The model facilitated the planning committee in answering questions such as how large will the entering freshman class need to be in order to achieve a full-time enrollment goal in three, four, or five years. Because the model separates BACC and NBACC programs, the committee can anticipate changes in the overall retention rate of the institution as more and more students enter the institution enrolled in a BACC program. By changing the size of the freshman class and viewing a best versus worst case scenario, the planning committee can also reasonably anticipate the future growth of the student body. Finally, in linking planning to budgeting, the enrollment model has provided the five-year enrollment estimates which drive the financial forecasting model.

CONCLUSION

The enrollment forecasting model has been an aid to the administration in several ways, most especially in the areas of budgeting and strategic planning. The model was developed in response to changes resulting from organizational adaptation to shifting demographics. As the institution advances closer to the final stages of transition and establishes itself as a baccalaureate institution, the enrollment forecasting model will be modified. During the current flux, the model provides reliable enrollment estimates that are predicated on the transitional composition of the student body from predominantly NBACC to BACC programs. Institutional research will continue to serve an important role in aiding the college planning and budgeting efforts by maintaining an enrollment forecasting model which is sensitive to the institutional transition.

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